

CLAIMS

What is claimed is:

1. A medical device delivery system for therapeutically treating a patient, comprising:

5 an inner shaft, having proximal and distal ends;

a tubular outer sheath, at least a portion of which surrounds a portion of the inner shaft member;

a medical device within the outer sheath in an initial configuration;

10 a handle affixed to the inner shaft and operatively coupled with the outer sheath;

a first and second independently movable actuator for adjusting the relative positions of the inner shaft and the outer sheath, each of the first and second actuators providing a different amount of mechanical advantage between an input to one of the first and second actuators by a physician and a resulting relative position of the inner shaft and the outer sheath respectively; and

15 a locking member that releasably holds the outer sheath relative to the inner shaft in an initial configuration, thereby holding the outer sheath in the initial configuration and tending to resist inadvertently uncovering the medical device.

20 2. The medical device delivery system of claim 1, wherein the locking member has first and second surfaces, such that in the initial configuration the first surface releasably holds a component attached to the outer sheath, and the second surface releasably holds a portion of the handle.

3. The medical device delivery system of claim 1, wherein the locking member has one or more flanges that releasably resist movement of one or more of the first and second actuators.

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4. The medical device delivery system of claim 1, wherein the first actuator provides a mechanical advantage of 1:1.

5. The medical device delivery system of claim 1, wherein the first
10 actuator is adapted to slide along a longitudinal slot defined by the handle.

6. The medical device delivery system of claim 1, wherein the second actuator provides a mechanical advantage greater than 1:1, to facilitate an operator to overcome initial resistance to changing the initial relative position of the inner shaft and
15 the outer sheath.

7. The medical device delivery system of claim 1, wherein the second actuator is adapted to rotate around a threaded base.

20 8. The medical device delivery system of claim 1, wherein the second actuator provides a variable mechanical advantage that can be selected by an operator from among a pre-selected range of possible mechanical advantages.

9. The medical device delivery system of claim 1, wherein one of the first and second actuators is formed as a lever.

10. The medical device delivery system of claim 1, further comprising
5 a guidewire lumen for slidably receiving a flexible guidewire.

11. The medical device delivery system of claim 1, wherein the medical device is a stent.

10 12. The medical device delivery system of claim 11, wherein the stent is of the self-expanding type.

13. The medical device delivery system of claim 1, wherein the first and second actuators are movably mounted to the handle.

14. A handle for manipulating a medical device delivery system for therapeutically treating a patient, comprising:

a housing;

first and second shaft members;

5 the first shaft member being affixed to the housing;

the second shaft member being movably coupled to the first shaft member, such that the second shaft member can be moved longitudinally with respect to the first shaft member;

first and second independent means for selectively moving the second
10 shaft member with respect to the first shaft member;

the first means being adapted for precise and sensitive adjustment of the position of the second shaft member, and the second means being adapted for rapid and relatively large-scale movement of the second shaft member; and

a locking member that releasably holds the first and second shafts in a
15 constant initial relative position.

15. A handle for manipulating a stent delivery system to therapeutically treat a patient, comprising:

a housing having a slot and a drive shoulder;

20 inner and outer shaft members; the inner shaft member being affixed to the housing;

at least a portion of the outer shaft member surrounding a portion of the inner shaft member, such that the outer shaft member can be moved longitudinally with respect to the inner shaft member;

a hub assembly affixed to a proximal end of the outer shaft member and
5 being longitudinally movable within the housing; the hub assembly having a grasping knob and a threaded drive member; the grasping knob extending outward through the housing slot;

wherein the hub assembly may be directly moved in a longitudinal direction relative to the inner shaft member by pulling on the grasping knob;

10 a rotatable actuator having a bearing surface and being mounted about the threaded drive member in threaded engagement; such that rotation of the actuator in a selected direction about the threaded drive member causes the rotatable actuator to press on the bearing surface, thereby pulling in a proximal direction the threaded drive member, hub and outer shaft member;

15 whereby the position of the outer shaft member relative to the inner shaft member may be adjusted by the rotatable actuator in a precise and sensitive manner, while movement of the grasping knob causes rapid and relatively large-scale movement of the outer shaft member relative to the inner shaft member; and

a locking member that releasably holds the inner and outer shafts in a
20 constant initial relative position.